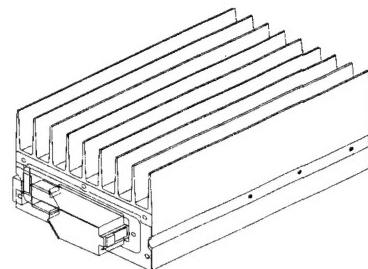


# Service Service Service



# Service Manual

**12 V**

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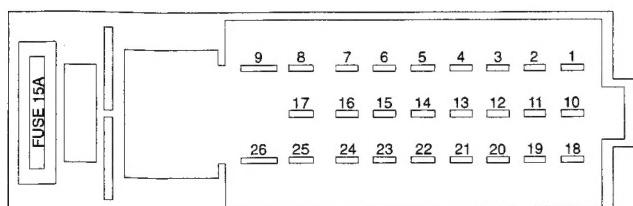


## TECHNICAL DATA

|                         |  |
|-------------------------|--|
| Power supply:           | 9,0 V - 16,0 V<br>11,0 V - 15,0 V (full Spec.)   |
| Quiescent current:      | < 0,5 mA (amplifier off)<br>< 1,0 A (amplifier on)                                     |
| Power consumption max.: | 15 A   |
| Load impedance:         | Bass: 8 Ω<br>Front / Rear: 8 Ω   |
| Line in voltage:        | < 10,0 V <sub>eff</sub>  |
| Line in impedance:      | < 470 Ω  |
| Line out voltage:       | Bass: < 17 V <sub>eff</sub><br>Front / Rear: < 14V <sub>eff</sub>                      |
| Power output (sinus):   | Bass: 19 W (f = 1 KHz, 1% harm.dist.)<br>Front / Rear: 23 W (f = 40 Hz, 1% harm.dist.) |
| Signal / Noise:         | > 70 dB  |
| Crosstalk:              | < 40 dB (at 2 KHz)   |

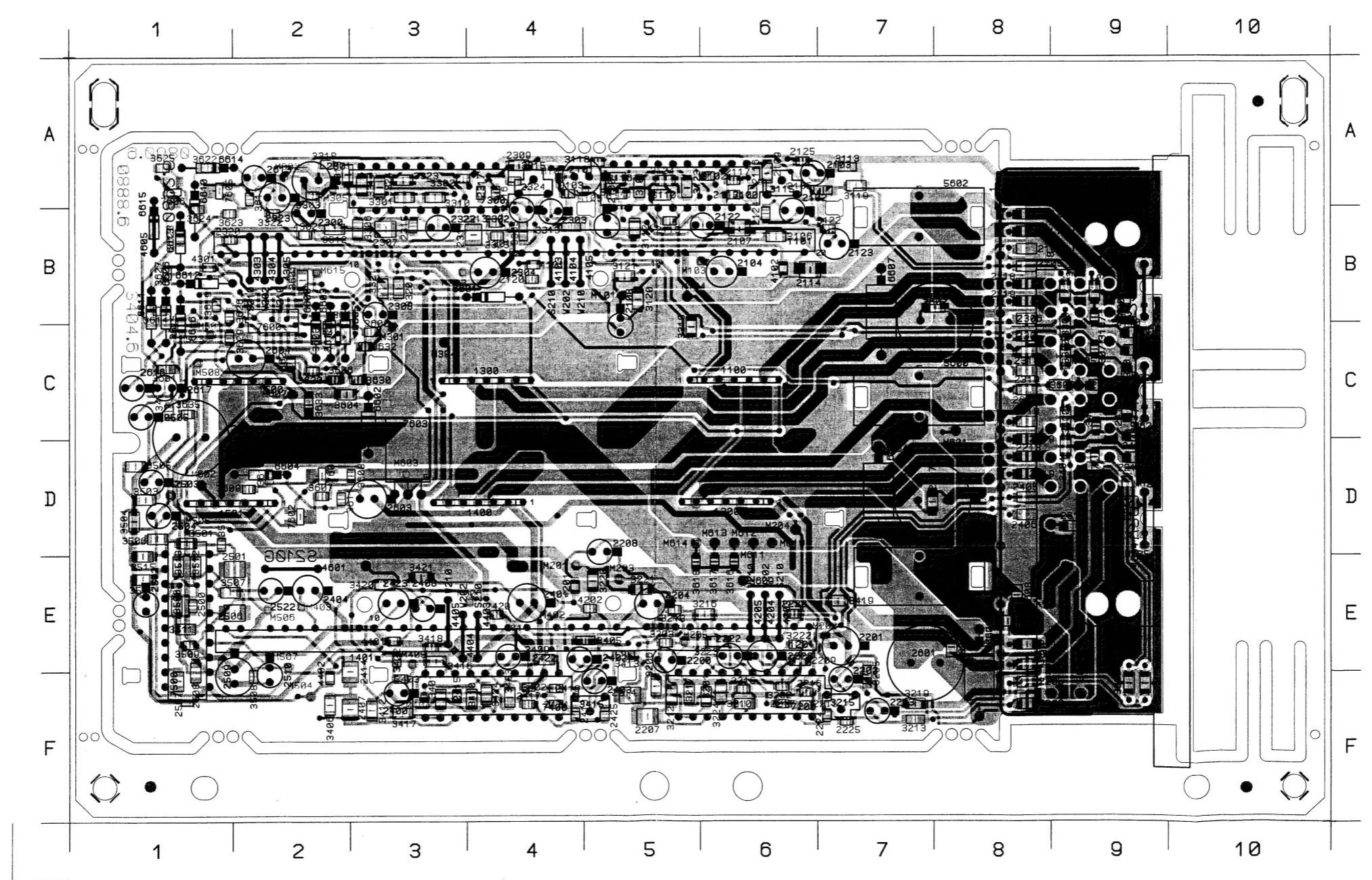
## CHECKS (Supply voltage 14,0 V)

|             |                        |   |
|-------------|------------------------|---|
| VREF        | M103, M203, M303, M403 | 6,5 V                                     |
| 13V5 / +2a  | M606                   | 13,0 V                                    |
| 14V4 / +1a  | M602                   | 14,0 V                                    |
| 14V4 / +1b  | M603                   | 14,0 V                                    |
| 14V4 / +1c  | M604                   | 14,0 V                                    |
| 14V4 / +1   | M601                   | 14,0 V                                    |
| V-REF / 5V6 | M615                   | 5,6 V                                     |
| U-ST / 13V5 | M607                   | 9,2 V                                     |
| +REM / 14V4 | M605                   | 9 V < + REM < 9,5 V => Low voltage off    |
| +REM / 14V4 | M605                   | 16 V < + REM < 16,5 V => High voltage off |

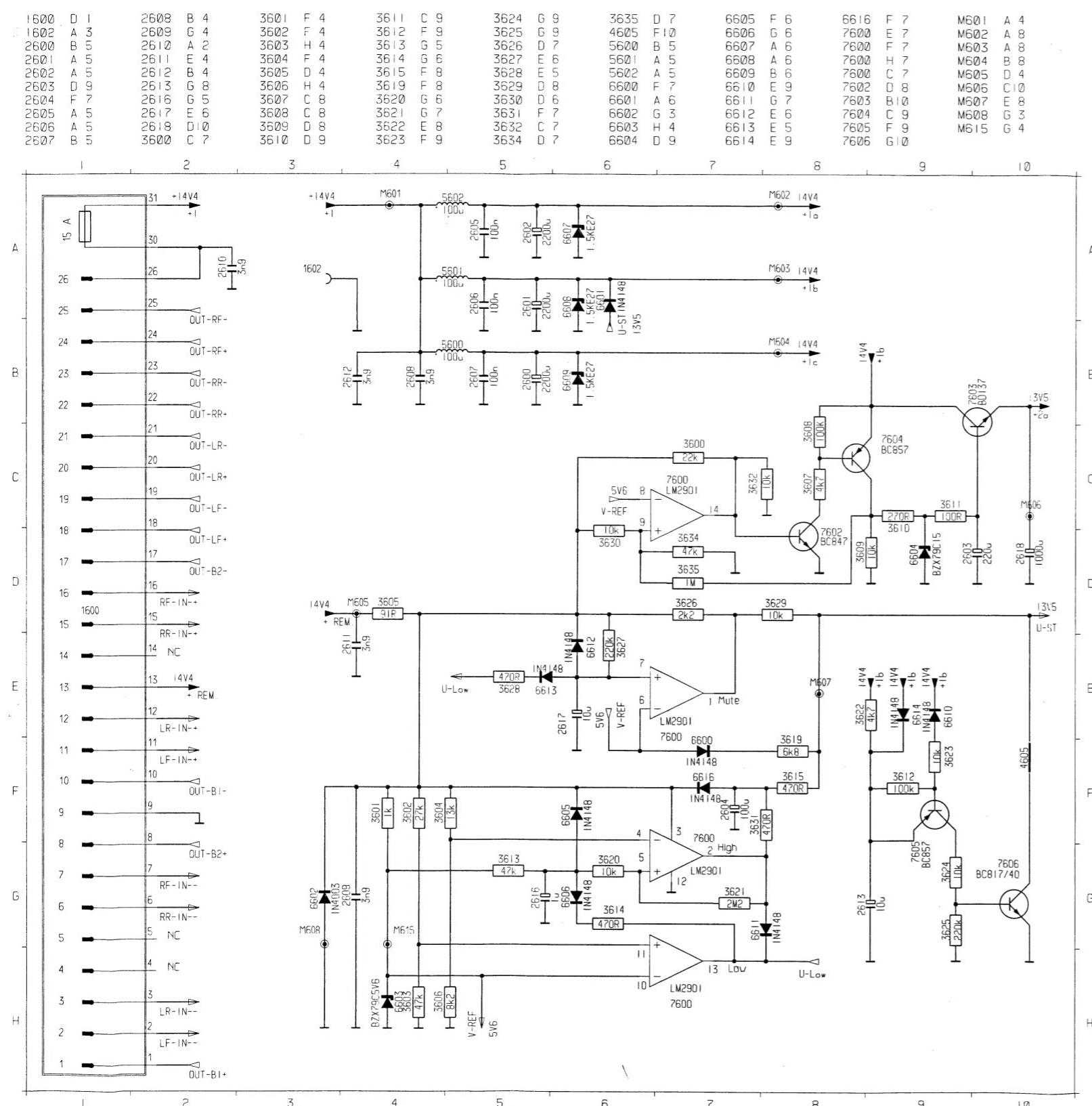


|                 |                      |                      |
|-----------------|----------------------|----------------------|
| 1: BASS 1 +     | 10: BASS 1 -         | 19: LF -             |
| 2: LINE IN LF - | 11: LINE IN LF +     | 20: LR+              |
| 3: LINE IN LR - | 12: LINE IN LR +     | 21: LR -             |
| 4: NC           | 13: REMOTE + (14,4V) | 22: RR +             |
| 5: NC           | 14: NC               | 23: RR -             |
| 6: LINE IN RR - | 15: LINE IN RR +     | 24: RF +             |
| 7: LINE IN RF - | 16: LINE IN RF +     | 25: RF -             |
| 8: BASS 2 +     | 17: BASS 2 -         | 26: IGN. KEY (14,4V) |
| 9: GND          | 18: LF +             |                      |

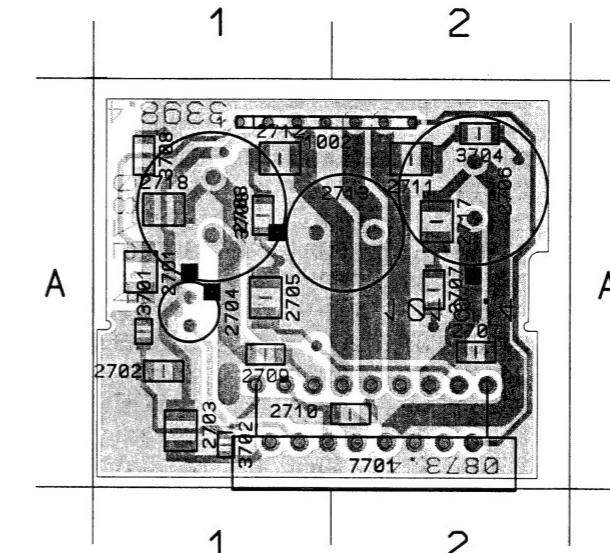
|          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1100 C 6 | 2110 C 9 | 2208 D 5 | 2306 B 8 | 2404 E 2 | 2502 E 1 | 2607 D 7 | 3116 A 5 | 3217 F 5 | 3318 A 2 | 3419 E 7 | 3602 B 2 | 3624 B 1 | 4301 B 1 | 6604 D 2 | 7605 A 1 | M501 B 1 | M615 B 2 |
| 1101 B 5 | 2111 B 9 | 2209 E 6 | 2307 B 3 | 2405 D 8 | 2503 D 1 | 2608 E 8 | 3117 A 5 | 3218 E 5 | 3319 C 5 | 3420 E 3 | 3603 C 2 | 3625 A 1 | 4302 B 2 | 6605 C 2 | 7606 A 1 | M502 D 1 | M620 B 9 |
| 1200 D 6 | 2113 A 6 | 2210 D 9 | 2308 B 3 | 2406 D 8 | 2504 D 1 | 2609 C 8 | 3118 A 5 | 3219 F 7 | 3320 B 3 | 3421 E 3 | 3604 C 2 | 3626 B 1 | 4303 B 2 | 6606 B 1 | M101 B 5 | M503 C 1 | M621 B 9 |
| 1201 E 5 | 2114 B 6 | 2211 D 9 | 2309 A 4 | 2407 F 2 | 2505 C 1 | 2610 D 9 | 3119 A 7 | 3220 E 5 | 3321 B 3 | 3422 E 3 | 3605 C 9 | 3627 B 1 | 4304 B 2 | 6607 B 7 | M102 A 4 | M504 F 2 | M622 C 9 |
| 1300 C 4 | 2115 B 5 | 2213 F 6 | 2310 C 9 | 2408 E 3 | 2506 E 2 | 2611 C 9 | 3120 B 5 | 3221 E 5 | 3322 B 2 | 3423 F 4 | 3606 C 2 | 3628 B 1 | 4305 B 2 | 6608 F 8 | M103 B 6 | M505 D 1 | M623 C 9 |
| 1301 B 3 | 2116 A 6 | 2214 F 5 | 2311 C 9 | 2409 E 4 | 2507 F 1 | 2612 E 8 | 3121 B 5 | 3222 E 6 | 3323 A 3 | 3424 F 4 | 3607 D 2 | 3629 C 1 | 4401 E 3 | 6609 D 7 | M104 B 5 | M506 E 2 | M624 D 9 |
| 1400 D 4 | 2117 A 6 | 2215 F 6 | 2313 B 4 | 2410 C 9 | 2508 E 1 | 2613 A 2 | 3122 B 7 | 3223 E 6 | 3324 A 3 | 3500 E 1 | 3608 D 3 | 3630 C 3 | 4402 F 2 | 6610 B 1 | M105 A 5 | M507 E 2 | M625 D 9 |
| 1401 E 3 | 2118 B 8 | 2216 F 6 | 2314 B 4 | 2411 C 9 | 2509 F 2 | 2616 C 1 | 3123 A 5 | 3224 F 6 | 3400 C 9 | 3501 D 1 | 3609 D 2 | 3631 C 1 | 4403 E 4 | 6611 B 1 | M201 E 4 | M508 C 1 |          |
| 1500 C 2 | 2119 B 8 | 2217 F 6 | 2315 B 3 | 2413 F 4 | 2510 F 2 | 2617 C 1 | 3124 A 5 | 3300 C 9 | 3401 F 3 | 3502 E 1 | 3610 D 2 | 3632 C 3 | 4404 E 3 | 6612 B 1 | M202 E 7 | M601 C 8 |          |
| 1501 D 1 | 2120 B 4 | 2218 D 8 | 2316 A 4 | 2414 E 2 | 2511 B 8 | 2618 C 1 | 3200 F 9 | 3301 A 3 | 3402 F 4 | 3503 D 1 | 3611 D 2 | 3633 C 2 | 4405 E 3 | 6613 B 1 | M203 E 5 | M602 D 1 |          |
| 1600 D 9 | 2122 B 6 | 2219 D 8 | 2317 A 4 | 2415 F 3 | 2512 B 8 | 3100 B 9 | 3201 F 6 | 3302 A 3 | 3403 F 3 | 3504 D 1 | 3612 A 2 | 3634 C 1 | 4601 E 2 | 6614 A 1 | M204 D 6 | M603 D 3 |          |
| 1602 D 8 | 2123 B 7 | 2220 E 6 | 2318 C 8 | 2416 F 4 | 2513 E 8 | 3101 A 5 | 3202 F 6 | 3303 A 2 | 3404 D 9 | 3505 D 1 | 3613 C 2 | 3635 C 1 | 4602 B 9 | 6615 B 1 | M205 E 5 | M604 C 7 |          |
| 2100 B 5 | 2124 B 6 | 2222 E 6 | 2319 C 8 | 2417 F 4 | 2514 E 8 | 3102 A 6 | 3203 E 5 | 3304 C 9 | 3405 E 5 | 3506 D 1 | 3614 B 1 | 4101 B 4 | 4603 C 9 | 6616 C 1 | M301 C 3 | M605 C 9 |          |
| 2101 A 4 | 2125 A 6 | 2223 E 6 | 2320 B 1 | 2418 C 8 | 2515 D 1 | 3103 A 4 | 3204 F 9 | 3305 B 4 | 3406 F 2 | 3507 E 1 | 3615 C 1 | 4102 B 6 | 4604 D 9 | 7100 A 5 | M302 A 2 | M606 E 4 |          |
| 2102 B 6 | 2200 E 5 | 2224 F 7 | 2322 B 3 | 2419 D 8 | 2522 E 2 | 3104 B 9 | 3205 F 7 | 3306 B 3 | 3407 C 9 | 3508 F 2 | 3616 E 6 | 4103 B 4 | 4605 B 1 | 7200 F 6 | M303 B 3 | M607 C 2 |          |
| 2103 A 6 | 2201 E 7 | 2225 F 7 | 2323 A 2 | 2420 E 4 | 2600 D 7 | 3105 A 7 | 3206 F 5 | 3307 C 9 | 3410 F 4 | 3509 E 1 | 3617 E 6 | 4104 B 4 | 5600 C 7 | 7300 A 3 | M304 C 3 | M608 D 8 |          |
| 2104 B 6 | 2202 F 7 | 2300 B 2 | 2324 A 4 | 2422 E 4 | 2601 E 7 | 3106 B 6 | 3207 D 9 | 3310 A 3 | 3412 F 3 | 3510 D 1 | 3618 E 5 | 4105 B 4 | 5601 E 7 | 7400 F 4 | M305 A 2 | M609 E 6 |          |
| 2105 B 8 | 2203 F 7 | 2301 A 2 | 2325 B 4 | 2423 E 3 | 2602 B 8 | 3107 B 9 | 3210 F 6 | 3312 B 2 | 3413 E 5 | 3511 E 1 | 3619 B 1 | 4201 E 4 | 5602 B 7 | 7500 E 1 | M401 E 3 | M610 D 6 |          |
| 2106 B 8 | 2204 E 5 | 2302 B 4 | 2400 F 3 | 2424 F 4 | 2603 D 3 | 3110 A 5 | 3212 F 5 | 3313 B 4 | 3415 F 5 | 3512 E 1 | 3620 C 2 | 4202 E 5 | 6600 C 2 | 7600 B 2 | M402 E 4 | M611 D 6 |          |
| 2107 B 6 | 2205 F 8 | 2303 B 4 | 2401 E 4 | 2425 F 5 | 2604 C 2 | 3112 B 5 | 3213 F 7 | 3315 A 4 | 3416 E 3 | 3513 E 1 | 3621 C 2 | 4203 E 6 | 6601 B 4 | 7602 D 2 | M403 E 2 | M612 D 6 |          |
| 2108 C 5 | 2206 F 8 | 2304 B 4 | 2402 E 4 | 2500 E 1 | 2605 B 8 | 3113 A 7 | 3215 F 7 | 3316 A 2 | 3417 F 3 | 3600 C 3 | 3622 A 1 | 4204 E 6 | 6602 C 3 | 7603 D 3 | M404 F 3 | M613 D 6 |          |
| 2109 A 6 | 2207 F 5 | 2305 C 8 | 2403 F 5 | 2501 E 2 | 2606 E 8 | 3115 A 6 | 3216 E 6 | 3317 A 3 | 3418 E 3 | 3601 B 2 | 3623 B 1 | 4205 E 6 | 6603 C 2 | 7604 D 2 | M405 E 3 | M614 D 5 |          |



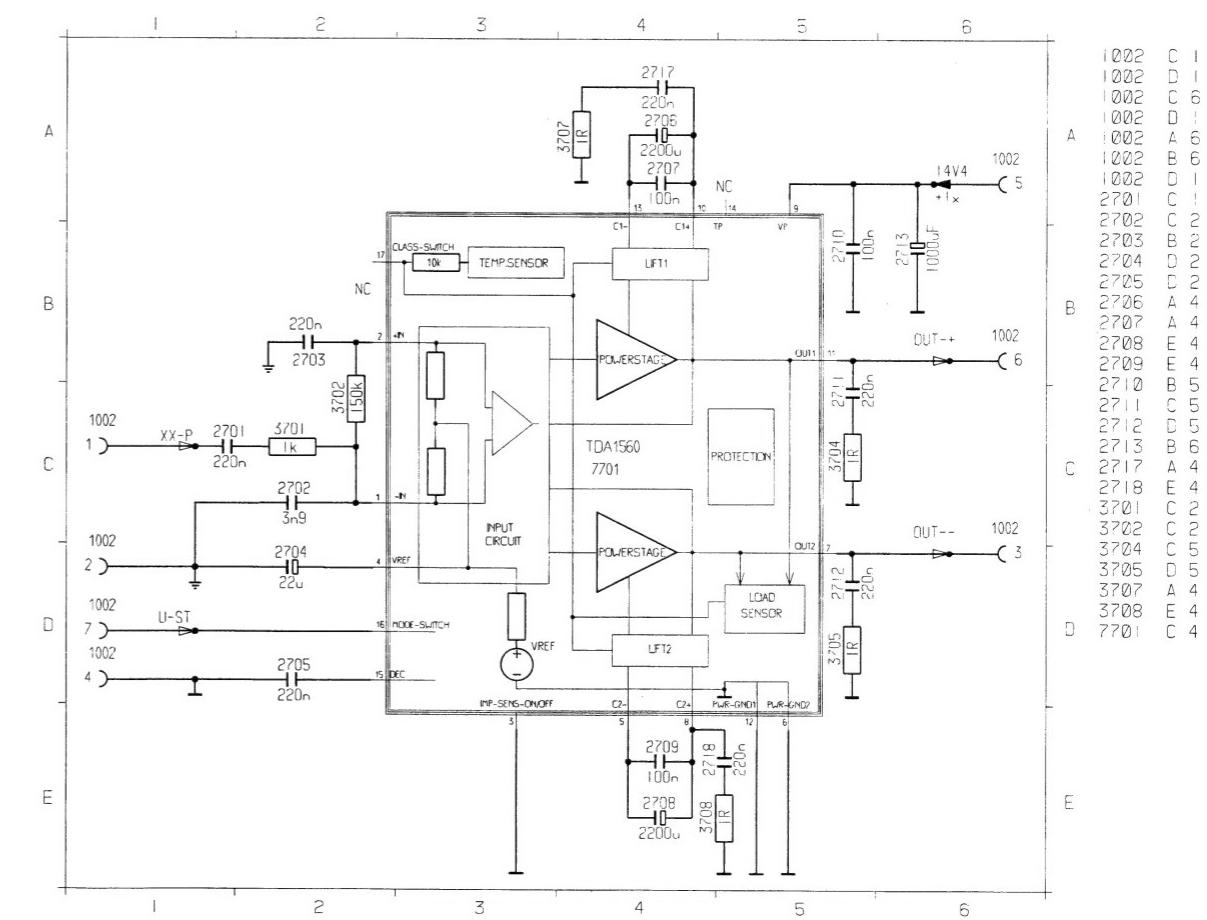
## **CONNECTOR BLOCK / POWER SUPPLY**



POWER MODUL

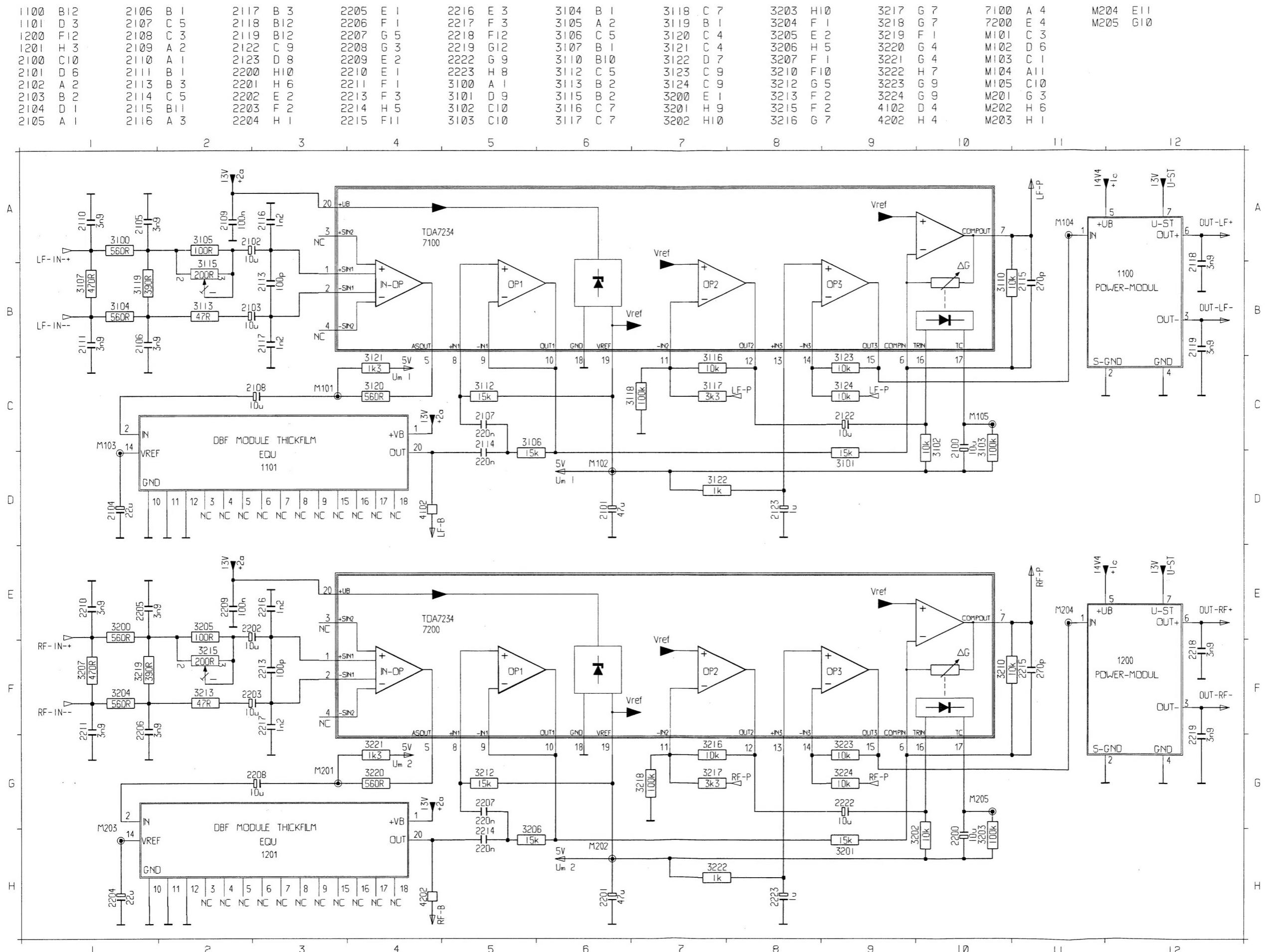


1002 A 1  
2701 A 1  
2702 A 1  
2703 A 1  
2704 A 1  
2705 A 1  
2706 A 2  
2707 A 2  
2708 A 1  
2709 A 1  
2710 A 2  
2711 A 2  
2712 A 1  
2713 A 2  
2717 A 2  
2718 A 1  
3701 A 1  
3702 A 1  
3704 A 2  
3705 A 1  
3707 A 2  
3708 A 1  
7701 A 2

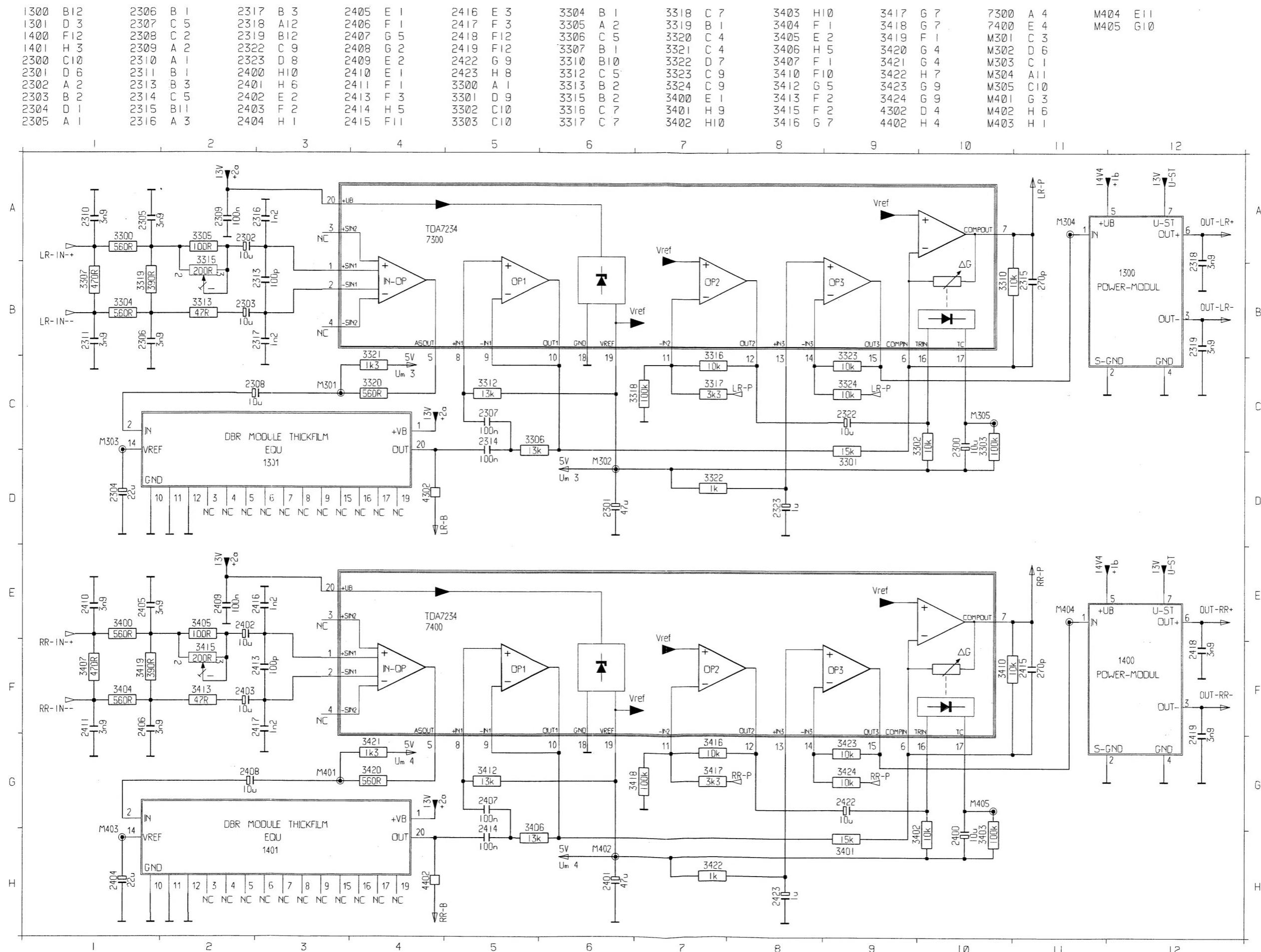


|      |   |    |   |
|------|---|----|---|
| 1002 | C | 1  | 1 |
| 1002 | D | 1  | 6 |
| 1002 | D | 2  | 6 |
| 1002 | A | 3  | 6 |
| 1002 | B | 4  | 6 |
| 1002 | D | 5  | 1 |
| 2701 | C | 1  | 2 |
| 2702 | C | 2  | 2 |
| 2703 | B | 3  | 2 |
| 2704 | D | 4  | 2 |
| 2705 | D | 5  | 2 |
| 2706 | A | 6  | 4 |
| 2707 | A | 7  | 4 |
| 2708 | E | 8  | 4 |
| 2709 | E | 9  | 4 |
| 2710 | B | 10 | 5 |
| 2711 | C | 11 | 5 |
| 2712 | C | 12 | 5 |
| 2713 | B | 13 | 6 |
| 2717 | A | 14 | 4 |
| 2718 | E | 15 | 2 |
| 3701 | C | 16 | 2 |
| 3702 | C | 17 | 2 |
| 3704 | C | 18 | 5 |
| 3705 | D | 19 | 5 |
| 3707 | A | 20 | 4 |
| 3708 | E | 21 | 4 |
| 3709 | E | 22 | 4 |

## FRONT AMPLIFIER

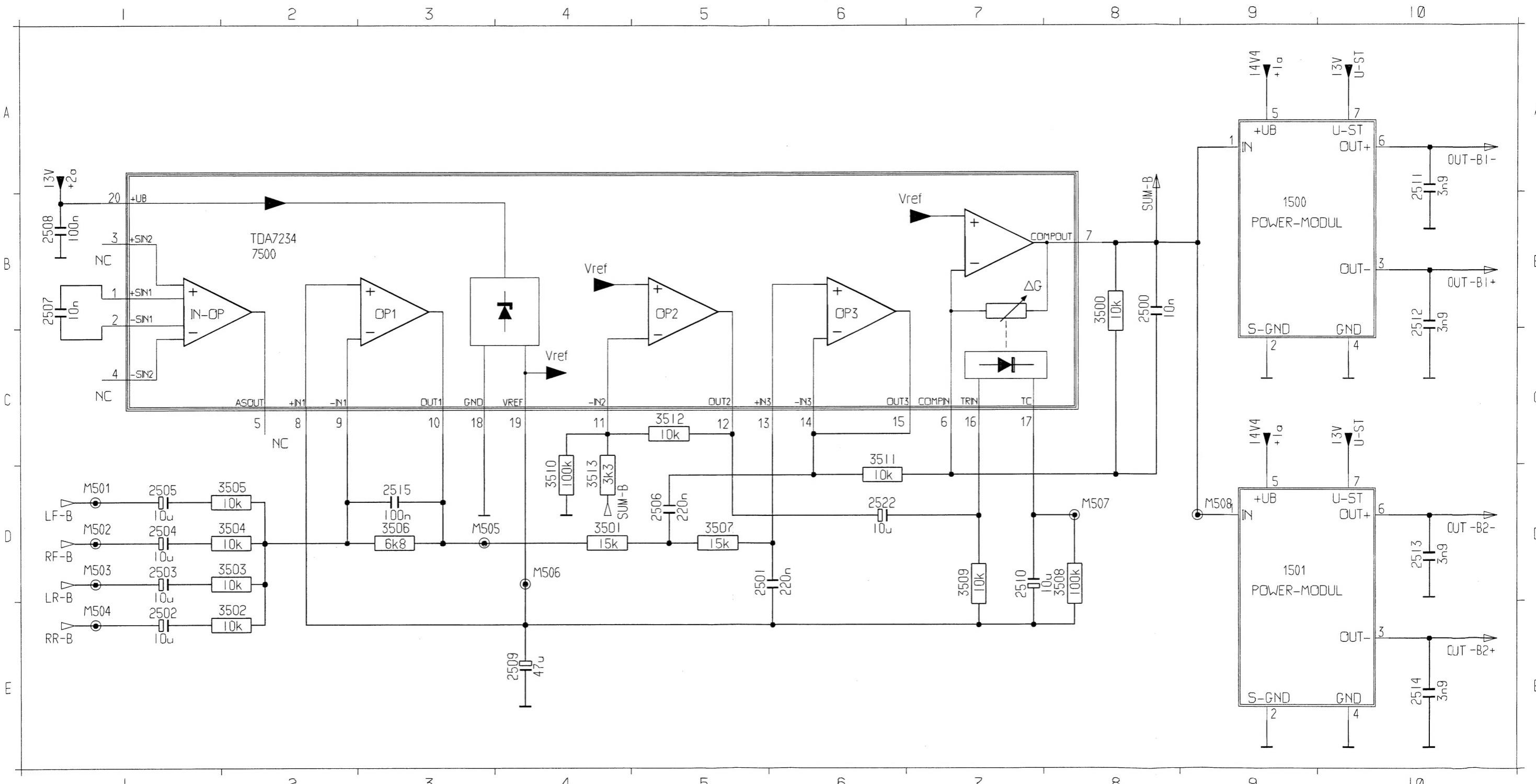


### REAR AMPLIFIER

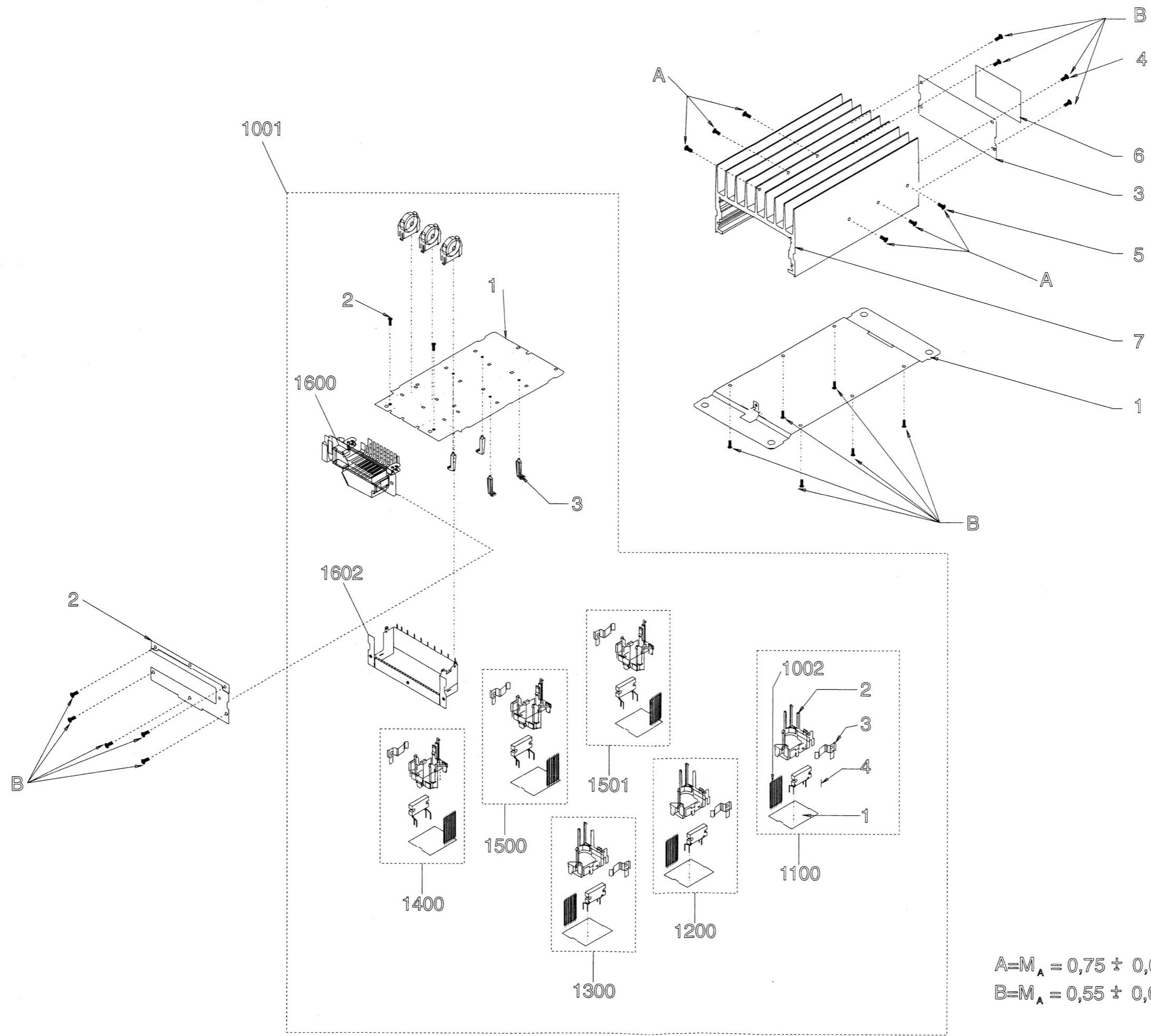


### BASS AMPLIFIER

|          |          |           |           |          |          |          |          |          |
|----------|----------|-----------|-----------|----------|----------|----------|----------|----------|
| 1500 B 9 | 2503 D 1 | 2508 B 1  | 2513 D 10 | 3501 D 4 | 3506 D 3 | 3511 C 6 | M502 D 1 | M507 D 8 |
| 1501 D 9 | 2504 D 1 | 2509 E 4  | 2514 E 10 | 3502 E 2 | 3507 D 5 | 3512 C 5 | M503 D 1 | M508 D 9 |
| 2500 B 8 | 2505 D 1 | 2510 D 7  | 2515 D 3  | 3503 D 2 | 3508 D 8 | 3513 D 4 | M504 E 1 |          |
| 2501 D 5 | 2506 D 5 | 2511 A 10 | 2522 D 6  | 3504 D 2 | 3509 D 7 | 7500 B 2 | M505 D 3 |          |
| 2502 E 1 | 2507 B 1 | 2512 B 10 | 3500 B 8  | 3505 D 2 | 3510 D 4 | M501 D 1 | M506 D 4 |          |



**EXPLODED VIEW**



A =  $M_A = 0,75 \pm 0,05 \text{ Nm}(6x)$

B =  $M_A = 0,55 \pm 0,05 \text{ Nm}(15x)$

## PARTSLIST

For all capacitors, resistors and coils not mentioned here, refer to standard component catalogue.  
Service code is 4822 736 53404.

|                             |                |                  |             |      |
|-----------------------------|----------------|------------------|-------------|------|
| <u>Miscellaneous</u>        | 4822 252 51113 | FUSE 15A         |             |      |
| 1101, 1201                  | 4822 214 52311 | THICKFILM UNIT   | FRONT       |      |
| 1301, 1401                  | 4822 214 52309 | THICKFILM UNIT   | REAR        |      |
| <u>Capacitors</u>           |                |                  |             |      |
| 2100                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2101                        | 4822 124 80724 | CAP.ELECTROLYT.  | 47UF20%     | 10V  |
| 2102, 2103, 2108            | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2122                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2123                        | 4822 124 80725 | CAP.ELECTROLYT.  | 1UF20%      | 50V  |
| 2200                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2201                        | 4822 124 80724 | CAP.ELECTROLYT.  | 47UF20%     | 10V  |
| 2202, 2203, 2208            | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2222                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2223                        | 4822 124 80725 | CAP.ELECTROLYT.  | 1UF20%      | 50V  |
| 2300                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2301                        | 4822 124 80724 | CAP.ELECTROLYT.  | 47UF20%     | 10V  |
| 2302, 2303, 2308            | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2322                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2323                        | 4822 124 80725 | CAP.ELECTROLYT.  | 1UF20%      | 50V  |
| 2400                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2401                        | 4822 124 80724 | CAP.ELECTROLYT.  | 47UF20%     | 10V  |
| 2402, 2403, 2408            | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2422                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2423                        | 4822 124 80725 | CAP.ELECTROLYT.  | 1UF20%      | 50V  |
| 2502 - 2505                 | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2509                        | 4822 124 80724 | CAP.ELECTROLYT.  | 47UF20%     | 10V  |
| 2510, 2522                  | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2600 - 2602                 | 4822 124 80707 | CAP.ELECTROLYT.  | 2200UF20%   | 25V  |
| 2603                        | 4822 124 41097 | CAP.ELECTROLYT.  | 220UF 20%   | 16V  |
| 2604                        | 4822 124 81195 | CAP.ELECTROLYT.  | 100UF20%    | 16V  |
| 2613                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2616                        | 4822 124 80725 | CAP.ELECTROLYT.  | 1UF20%      | 50V  |
| 2617                        | 4822 124 80813 | CAP.ELECTROLYT.  | 10UF20%     | 16V  |
| 2618                        | 4822 124 80766 | CAP.ELECTROLYT.  | 1000UF20%   | 25V  |
| 2701, 2703, 2705            | 4822 122 32916 | CAP.CHIP         | 220NF10%X7R | 63V  |
| 2706, 2708                  | 4822 124 80769 | CAP.ELECTROLYT.  | 2200UF20%   | 16V  |
| 2711, 2712                  | 4822 122 32916 | CAP.CHIP         | 220NF10%X7R | 63V  |
| 2713                        | 4822 124 80766 | CAP.ELECTROLYT.  | 1000UF20%   | 25V  |
| 2717, 2718                  | 4822 122 32916 | CAP.CHIP         | 220NF10%X7R | 63V  |
| <u>Resistors</u>            |                |                  |             |      |
| 3115, 3215                  | 5322 100 11588 | POTM.TRIMMER     | 220R 30%lin | 0,1W |
| 3315, 3415                  | 5322 100 11588 | POTM.TRIMMER     | 220R 30%lin | 0,1W |
| <u>Coils</u>                |                |                  |             |      |
| 5600 - 5602                 | 4822 157 70935 | COIL FILTER ASSY |             |      |
| <u>Diodes</u>               |                |                  |             |      |
| 6600, 6601                  | 4822 130 30621 | DIODE            | 1N4148      |      |
| 6602                        | 4822 130 31545 | RECTIFIER        | 1N4003GP    |      |
| 6603                        | 4822 130 34173 | DIODE            | BZX79-C5V6  |      |
| 6604                        | 4822 130 34281 | DIODE            | BZX79-C15   |      |
| 6605, 6606                  | 4822 130 30621 | DIODE            | 1N4148      |      |
| 6607 - 6609                 | 4822 130 82465 | DIODE            | 1.5KE27P    |      |
| 6610 - 6614, 6616           | 4822 130 30621 | DIODE            | 1N4148      |      |
| <u>Transistors and IC's</u> |                |                  |             |      |
| 7100 - 7500                 | 4822 209 91139 | INTEGR.CIRCUIT   | TDA7234     |      |
| 7600                        | 4822 209 91034 | INTEGR.CIRCUIT   | LM2901D     |      |
| 7602                        | 4822 130 42705 | TRANSISTOR,CHIP  | BC847       |      |
| 7603                        | 4822 130 40823 | TRANSISTOR       | BD137       |      |
| 7604, 7605                  | 4822 130 61233 | TRANSISTOR,CHIP  | BC857       |      |
| 7606                        | 4822 130 42615 | TRANSISTOR,CHIP  | BC817-40    |      |
| 7701                        | 4822 209 91035 | INTEGR.CIRCUIT   | TDA1560Q/N4 |      |